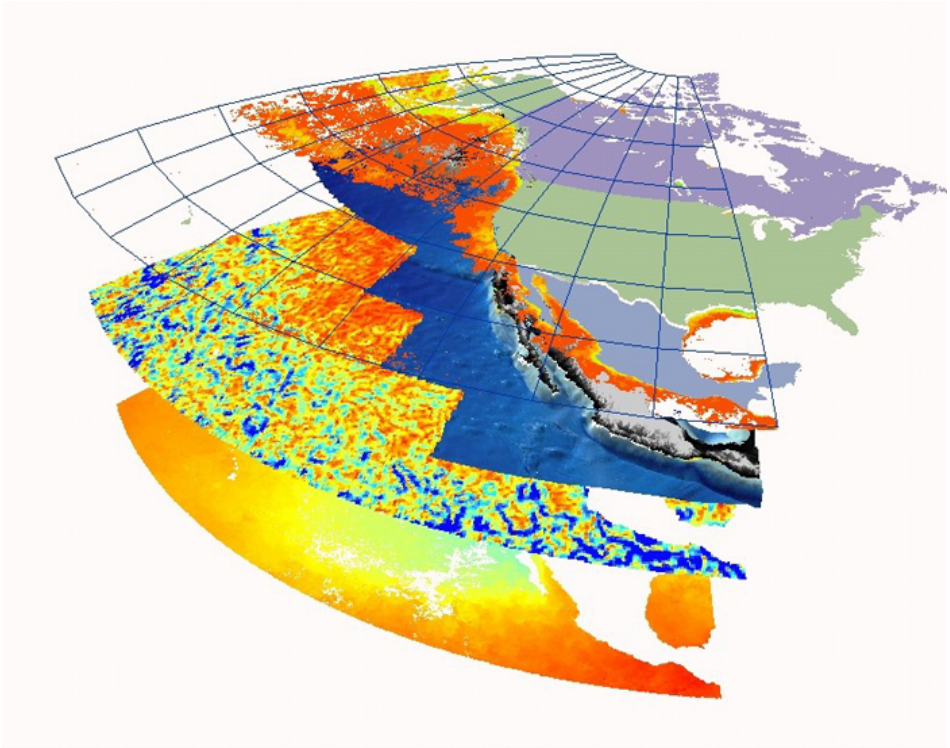
WORKSHOP REPORT ON DATA GATHERING FOR THE BAJA CALIFORNIA TO BERING SEA INITIATIVE

PORTLAND, OREGON
July 1-2, 2002



MARINE CONSERVATION BIOLOGY INSTITUTE 2003

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EXECUTIVE SUMMARY

The Baja California to Bering Sea (B2B) "Data Potluck" was a first-of-its-kind event – an invention born of necessity. Building on a previous workshop held in Monterey, CA the Data Potluck brought together representatives from government, academic, and non-government organizations and agencies to discuss and contribute data identified as relevant to tri-national marine priority conservation areas assessment. At the Monterey Workshop ecology and policy experts recommended physical, biological, and social datasets for Marine Conservation Biology Institute (MCBI) to collect and disseminate as a precursor to a conservation priority areas setting exercise. The Data Potluck was convened to share information pertaining to the priority setting work and uncover additional datasets.

Nearly 80 representatives from 30 organizations convened at this meeting in Portland, OR to learn about and exchange datasets relevant to the identification of priority conservation areas. Twelve datasets were contributed. In the course of two days, a wide range of topics were presented and discussed, including ocean circulation models from the US Navy, atmospheric circulation models from Colorado Center for Atmospheric Research, threats to the Colorado River Delta, whale tracking experiments from Oregon State University, upwelling from Pacific Marine Environmental Laboratory, and the historical distribution of tribal fishing weirs, to name just a few.

This gathering had additional benefits to the development of the B2B Marine Conservation Initiative. We identified many "parallel projects" within the B2B region that have strong sub-regional potential, as well as common data needs for a more evenly distributed workload, and a potential for these disparate organizations to begin to speak with one voice, without sacrificing their individual institutional goals.

MCBI staff also took advantage of the assembled "consciousness" to conduct a survey of marine GIS users to understand their opinions on the data needed for successful identification of priority conservation areas. They ranked bathymetry and primary productivity data the highest and also identified substrate type, spawning aggregations, submarine cables, political climate, pollution and community will as important data.

Most significantly, we arrived at a consensus on the general framework to determine a priority conservation area. Priority is established based on three aspects: a valued component of biodiversity, threats to it and opportunities for protection.

MCBI used the survey information, the data collected at the potluck, and the collective assets of the coalition to generate a unique dataset of physical, biological, and social information relevant to the identification of conservation priority areas along the North American West Coast. This dataset is contained on a CD-ROM titled "B2B 1.0." All this allows us to move forward with confidence in identifying priority conservation areas in the B2B region at a later expert "Delphic" workshop.

PREFACE

GIVEN THE CIRCUMSTANCES: DATA POTLUCK

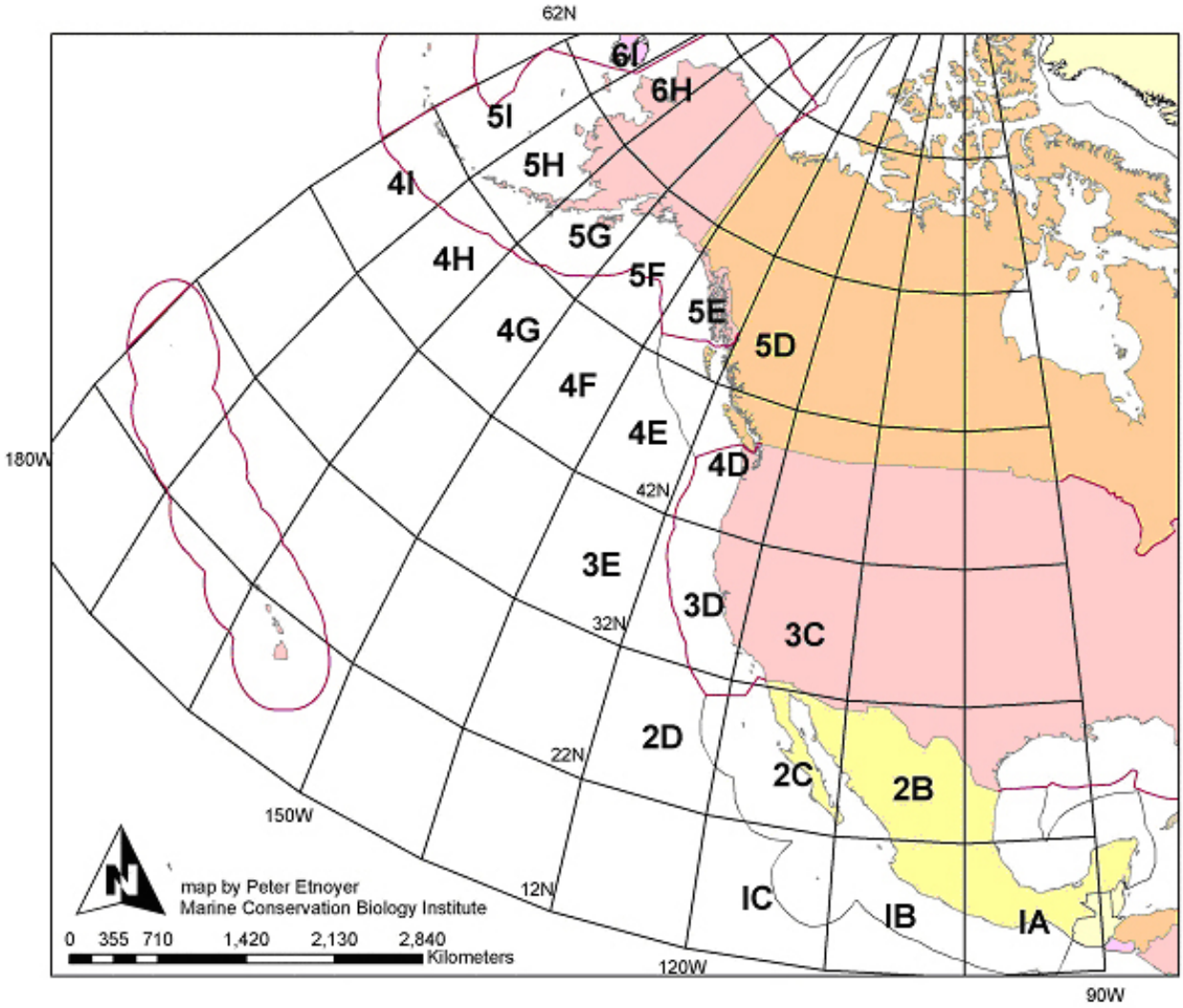
In North America, the term “potluck” has been around for a long time. According to the Merriam Webster’s Collegiate Dictionary, potluck is “the regular meal available to a guest for whom no special preparations have been made.” The second meaning however, as “a communal meal to which people bring food to share” is the definition that matches the more common understanding of this term.

Another more intriguing definition is “whatever is offered or available in given circumstances or at a given time.” From this definition comes the more appropriate relevance to marine conservation, and characterizes only too well the situation for a marine conservation planning – “I’ll take what you got” – potluck.

The term potluck is also similar to the word potlatch. The word potluck appears to have originated in 1592, a time when Europeans were first making contact with the native people who used the word potlatch. In the potlatch, native families demonstrated their wealth by giving away more than their neighbors. Those that could give more would win the highest status. The native use also matches at least some of our intent in pursuing the idea of the data potluck. We all give according to our situation at any time in our lives. If we have more, we can give more. If less, then a smaller contribution is understood to be part of our “given circumstances."

We hope you will find value in the Data Potluck report. It was brought forth by many different organizations and institutions, each according to their “given circumstances.” We further hope the Data Potluck will serve as a collaborative model for future efforts.

B2B APPROVED DATAGRID



The Baja California to Bering Sea region has been subdivided into 10 degree blocks and projected into Lambert Azimuthal Equal Area (lon -100, lat 45) as advised by the USGS Hydro 1k project for North America. The cell blocks are numbered in the vertical and alphabetized in the horizontal with a lower right corner at (-90E, 12N). All global raster datasets (e.g. ETOPO2, AVHRR SST) should be subset to these parameters. Labeled cells represent those we seek to populate with data.

INTRODUCTION

The North American Marine Protected Area Network aims to enhance and strengthen the conservation of marine biodiversity in critical marine habitats throughout North America by creating functional linkages and information exchange among existing and planned marine protected areas. This program is an international collaboration of The Baja California to Bering Sea Marine Conservation Initiative (B2B), the North American Marine Protected Areas Network, coordinated by the North American Commission for Environmental Cooperation (CEC), and the World Conservation Union (IUCN) Commission on Protected Areas: North American Marine Working Group. Marine Conservation Biology Institute (MCBI) has undertaken the challenge of assisting the Network in identifying priority conservation areas for the Baja California to Bering Sea region.

In May of 2001, approximately 40 scientists and conservationists representing the governmental and non-governmental sectors from Canada, Mexico, and the United States convened in Monterey, California and reached a strong consensus that a map of priority areas would be a valuable tool to link conservation efforts in the three NAFTA countries. The overarching goal of a priority conservation area would be to conserve biodiversity, with benefits to fisheries, cultural values, recreation, and scientific research.

These experts agreed to develop a Geographic Information System (GIS) based on common physical data for the entire region to serve as a framework for integrating other information. The GIS will include layers of benthic and pelagic biological and physical data, be used as a tool for research and analysis of species diversity, incorporate information from ongoing CEC projects (Marine Species of Common Conservation Concern and Ecosystem Mapping), and incorporate ongoing and existing priority area designation processes.

On July 1 and 2 of 2002, approximately 80 scientists and conservationists representing the governmental and non-governmental sectors from Canada, Mexico, and the United States convened in Portland, OR to describe, detail and contribute information that the Monterey Workshop indicated as important. A survey was also conducted to determine relevance and completeness of the data, and how to best use the data to create a list of priority habitats. This function was co-hosted by Marine Conservation Biology Institute, the Commission on Environmental Cooperation, Ecotrust, and the Surfrider Foundation. The product of this Data Potluck is captured on the B2B 1.0 CD-ROM. It includes much of the information presented at this event, but represents only the first iteration of data relevant to the establishment of priority conservation areas in the B2B region.

This brief communiqué serves to document the Portland “Data Potluck.”

NOTES ON THE DATA GATHERING WORKSHOP

The data gathering workshop, dubbed "Data Potluck," was the second in a series of technical meetings designed to build consensus on spatial methods of analysis for priority conservation areas. The experts at the first workshop recommended developing a Geographic Information System (GIS) based on common physical data for the entire region to serve as a framework for integrating other information. The GIS will include layers of benthic and pelagic physical data, be used as a tool for research and analysis of species diversity, incorporate information from ongoing CEC projects (Marine Species of Common Conservation Concern and Ecosystem Mapping), and incorporate ongoing and existing priority area designation processes.

Whereas experts at the first meeting held in Monterey called for data types such as sea surface temperature and surface currents, the Data Potluck presentations revealed a new emphasis on socio-economic information that was not evident in the previous Monterey Workshop. This difference in emphasis may be a result of the different background of the attendees at the two workshops, or may reflect the evolving nature of marine protected area (MPA) science.

The Data Potluck idea was very well received. Ed Backus of Ecotrust mentioned that the Potluck idea seemed awkward at first, but his staff eventually came to terms with the idea that a Potluck methodology provides an incentive to contribute, lowers expectations, and levels the playing field by providing all participants with the same information which they might then use to address their own concerns.

Nearly 80 representatives from 30 organizations convened at the Potluck to offer 12 datasets relevant to the establishment of priority conservation areas in exchange for access to all datasets for those who contributed data. As can be seen from the agenda (see Appendix 1), attendees learned about a diverse set of biological, physical and social data sets that could be adapted to their own regional conservation planning efforts. (See Appendix 2 for presentation abstracts.)

This gathering had additional benefits to the sustainability of the B2B Marine Conservation Initiative. Workshop participants identified many "parallel projects" within the continental B2B region that have strong sub-regional potential, and identified common data needs for a more evenly distributed workload, and a potential for these disparate organizations to begin to speak with one voice, without sacrificing their individual institutional goals.

MCBI staff also took advantage of the assembled "consciousness" to conduct a survey of marine GIS users to understand their opinions on the data needed for successful identification of priority conservation areas. This is further discussed in the Survey Results section.

MCBI used this survey information, the data collected at the potluck, and the collective assets of the workshop participants to generate a unique dataset of physical, biological, and social information relevant to the establishment of priority conservation areas along the North American West Coast. This enabled MCBI to produce a CD-ROM titled "B2B 1.0" which contains this dataset.

Table 1. Organizational participants and contributors to Data Potluck Workshop

Organization	Abbrev.	Contribution
Marine Conservation Biology Institute	MCBI	B2B 1.0 CDROM set
Ecotrust	Ecotrust	Internet Mapserver
Commission for Environmental Cooperation	CEC	Funding support
National Oceanic and Atmospheric Administration	NOAA	Landsat, US EEZ
National Marine Fisheries Service	NMFS	n/a
World Wildlife Fund- Canada	WWF	n/a
The Nature Conservancy-US	TNC	Priority polygons
The Nature Conservancy-Canada	TNC	n/a
Parks Canada	Parks CA	n/a
NASA Jet Propulsion Laboratory	NASA JPL	Surface Current model, daily GIFs
Conservation International	CI	Priority polygons
Wildcoast	Wildcoast	Turtle tracks and nesting beaches
Oregon State University	OSU	Blue whale tracks et al
San Francisco State University	SFSU	Mammal distribution
Pacific Marine Environmental Laboratory	PMEL	Upwelling areas
Colorado Center for Atmospheric Research	CCAR	Altimetry
Alaska Department of Fish and Game	AKDFG	Fisheries landings
Pronatura	Pronatura	Mexico MPAs
Coquille Indian Tribe	Coquille	Sea Otter distribution
Surfrider Foundation	Surfrider	NGO distribution
Canadian Wildlife Service	EC	Canada MPAs
Agromarinos	Agromarinos	n/a
People for Puget Sound	PPS	Database and priority polygons
Scripps Institute of Oceanography	SIO	n/a
The Ocean Conservancy	TOC	n/a
Partnership for Interdisciplinary Studies of Coastal Oceans	PISCO	n/a
Oregon Coastal Management Program	OSU	n/a
Point Reyes Bird Observatory	PRBO	n/a
Centro de Investigacion Cientifica y de Educacion Superior de Ensenada	CICESE	n/a
Audubon Society of Portland	Audubon	n/a
US Fish and Wildlife Service	USFWS	n/a

RELEVANT PROJECTS

Many among us have asked the question "how will B2B conservation priorities fit in with other conservation priority initiatives?" This question is critical. If it is believed that B2B will usurp those priorities, or conflict with those designations, there becomes less incentive to participate in the coalition building process, and less incentive to collaborate. However, the B2B scale of analysis is much larger than most existing priority conservation initiatives, covering 60 degrees of latitude and almost 7000 kilometers.

The size of B2B priority conservation areas will be appropriate to the "continental" scale, and will easily accommodate sub-regional scales. Where governments and NGOs have set their priorities already, the B2B priorities will seek to support those priorities. However, it is clear that continental scale priority conservation areas in the B2B region will be larger, with criteria that may not serve to replicate those regional efforts.

It is important to incorporate previous and ongoing priority setting efforts within the B2B region, and to find a way to benefit them all. This list of relevant projects is our first iteration of that effort. Some of these projects benefit the B2B Initiative indirectly by setting a precedent for analysis, whereas some of these projects could benefit B2B directly as local partners who provide on-the-ground support for designated priority conservation areas.

Table 2. Relevant Projects in the Baja California to Bering Sea ecoregion

Institution	Region	Relevant Project
NMFS/CCAR	Gulf of Alaska	Pinniped Pelagic Habitat
NOAA	US West Coast	Sanctuary Assessment and Hard Bottom
People for Puget Sound	Pacific Northwest	Orca Pass
Haida Gwaii	ongoing	Increased protection
CICESE	Colorado River/Gulf of California	Freshwater inputs to Gulf
US- DFG	Alaska	Alaska EFH
Mexico- Fortuna	Baja Peninsula, Mexico	Escalera Nautica
Scripps/ La Paz	Baja Peninsula, Mexico	?
US National Marine Sanctuary	Channel Islands, California	Channel Islands MPA assess
UC Davis- Mike Graham	California	Kelp Distribution
TNC	Pacific Northwest	North Coast Priorities
Ecotrust	Pacific Northwest	Sustainable Fishing Communities
Surfrider Foundation	US West Coast	Special Places Campaign

WORKSHOP CONCLUSIONS

The following salient points emerged from the Data Potluck:

1. Attendee's attitudes towards the concept of a priority area designation at the North America continental scale ranged from enthusiastic to confused to doubtful concerning the challenges of data integration, international cooperation, and synthesis.

2. The most prevalent concern was how to incorporate existing MPA designations, previous priority designations, and local projects. In part, the Data Potluck was designed to address this issue by asking various groups to come forward with their data, priorities and projects in a sense of greater community. Workshop attendees benefited from exposure to relevant projects and avenues for collaboration.

3. An alternative approach to a vision of "one single map" that represents a unified, multi-institutional perspective on priority habitats for conservation over this 6000-mile extent, is to generate a set of baseline data, and to share that data amongst organizations in order to foster future cooperation. MCBI, the CEC and Ecotrust will distribute the available information on a CD-ROM (B2B 1.0) and via the internet. Hopefully, this dataset will serve as a foundation for future regional analyses.

4. Data resolution is a vexing issue considering the B2B scale of analysis. Current analyses have sought data that is consistent throughout the B2B region. However in certain cases the best available data by region might better serve specific purposes.

5. Although it is tempting to incorporate all relevant data, in order to produce a high quality dataset with simple baseline information, the first release, B2B 1.0, delimits the data at the highest common denominator resolution across the entire B2B extent, e.g., 4km ETOPO2 bathymetry, 9km AVHRR SST, 7km surface currents.

6. While biodiversity protection is the ultimate goal of this priority area assessment, no such datasets are available. Comprehensive biogeographic datasets of species diversity will need to be researched and built if they are to be incorporated into future analyses. The best available dataset at this time is the PISCO information on intertidal diversity, but is only available for part of the B2B region. Continental scale biodiversity could be captured by protection of representative areas and endemic species at the regional scale.

7. The large geographic extent of the B2B region limits the viability of a data-driven analysis at this scale. Comprehensive data and dependable proxies do not exist. The most likely approach for the entire B2B region at this time is a site nomination delphic approach that includes specific physical datasets and analyses and captures the range of habitat diversity based on expert judgment related to biodiversity, threat and opportunity.

8. Further clarification of criteria needed for the B2B priority conservation area assessment is required.

SURVEY

Twenty respondents from the three NAFTA countries, all familiar with data-driven priority setting exercises for conservation goals, completed a survey conducted by MCBI. The survey consisted of three questions (see the survey form in Appendix 3):

- How would you rank the following data types for their potential contribution to a priority habitat analysis at the continental scale?
- How would you like to see these data layers used in a GIS to generate a list of priority habitats for the B2B region?
- What data is missing that you would like to see available?

Responses were summarized as follows and tabulated in Appendix 4.

How would you rank the following data types for their potential contribution to a priority habitat analysis at the continental scale?

Bathymetry, primary productivity, existing MPAs, and fishing pressure data were ranked highest (>4.5) for their ability to strengthen a GIS for a priority habitat analysis. All listed data (See Appendix 2) save LIDAR and NGO Activity ranked above 3.5 on a scale of 5.

Respondents generally valued their personal contributions ("Other") very highly, with substrate type, spawning aggregations, submarine cables, political climate, pollution and “community will” each receiving unsolicited votes from 20% of the respondents.

How would you like to see these data layers used in a GIS to generate a list of priority habitats for the B2B region?

The general response to this qualitative question was this:

Priority Conservation Area = biodiversity + threat + opportunity

People varied widely in their opinion of PCA goals, but the above model stands out as the most common view, with the most applicability.

Comments by Mexican participants strongly suggested that some kind of “governance index” or measurement of “community will” was important. This was reinforced by some US respondents who thought previously existing MPAs were the strongest candidates for enhanced protection. This reflects the general opinion that existing legislation rarely translates into effective management, and that boundaries are poor indicators of protection. Respondents also felt that submarine features and upwelling indices could benefit any PCA algorithm.

What data is missing that you would like to see available?

The responses in Appendix 4, coupled with the survey results, indicate the large amount of variability and opinion regarding critical data. The list of data represented in this Appendix could be viewed as a comprehensive work-plan for the B2B Initiative over the next five to ten years, or for any group wishing to organize future B2B Data Potlucks.

NEXT STEPS

The North American Marine Protected Area Network and MCBI are continuing the process of identifying priority conservation areas for the Baja California to Bering Sea region. The B2B 1.0 CD-ROM, which contains physical, biological and social data relevant to marine conservation planning efforts on North America's west coast, was released in December of 2002 and continues to be distributed.

An expert workshop to define the priority conservation areas for the Baja California to Bering Sea Region is also being planned for April, 2003 and is to be held in Vancouver, British Columbia.

For more information on B2B 1.0 CD-ROM, please visit MCBI's website at:

www.mcbi.org

For more information on the North American Marine Protected Areas Network, please visit the North American Commission for Environmental Cooperation's website at:

http://www.cec.org/programs_projects/conserv_biodiv/project/index.cfm?projectID=19&varlan=english

APPENDIX 1. WORKSHOP AGENDA

DAY ONE, July 1, 2002:
Workshop Presentations (see abstracts in Appendix 2, listed in order of presentation.)

8:30 – 8:50 **ArcGIS Marine Data Model**
Dawn Wright - Oregon State University

8:50 – 9:10 **The real time ocean environment**
Jay Shriver - U.S. Navy Research Laboratory

9:10 – 9:30 **Altimeter data for marine habitat monitoring**
Robert Leben - Colorado Center for Astrodynamics Research

9:30 – 9:50 **PFEL data holdings and data products: Serving fisheries science and resource management**
Frank Schwing - NOAA/NMFS Pacific Fisheries Environmental Laboratory

9:50 – 10:10 **Topographic remote sensing using LIDAR**
David Revell - Surfrider Foundation / NOAA Coastal Management Fellow

10:10 – 10:30 Break

10:30 – 10:50 **Pelagic predators, prey and processes: An initiative to protect offshore organisms and habitats**
Peggy Yen - Point Reyes Bird Observatory Conservation Science, Marine Science Division

10:50 – 11:10 **Monitoring eastern Pacific blue whale habits and habitats through satellite telemetry**
Tomas Follett - Oregon State University Marine Mammal Program

11:10 – 11:30 **Reconnecting the Eastern Pacific Ocean: Long distance migrations and conservation of sea turtles**
Wallace J. Nichols - WiLDCOAST International Conservation Team, Department of Herpetology - CALS

11:30 – 11:50 **Occurrence of leatherback sea turtles off the coast of Central California**
Scott Benson - NMFS; Peter Dutton - NMFS; Scott Eckert - Hubbs-Sea World Research Institute

11:50 – 12:10 **Ye gods! Commercial fishery harvest databases for Alaska**
Tim Harverland - Alaska Department of Fish and Game

12:10 – 13:10 LUNCH BREAK **–** on your own

13:10 – 13:30 **Lessons and products from the Groundfish Fleet Restructuring Project**
Ed Backus - Ecotrust

13:50 – 14:10 **Untrawlable areas, species assemblages and relationship to surficial sediments in the NMFS west coast bottom trawl survey**
Mark Zimmermann - NOAA/NMFS

14:10 – 14:30 **Historic fish taxa in Oregon estuaries, from ethnographic accounts and other historic records**
Scott Byram. - Consulting Archaeologist, Coquille Indian Tribe Cultural Resource Program;

Marguerite Forest - Coquille Indian Tribe

14:30- 14:50 **Using GIS to integrate data sources for sea otter restoration in Oregon**
Marguerite Forest - Coquille Indian Tribe

14:50 – 15:10 **Extirpated species from Oregon coast archaeological sites and beyond**
Robert Losey - University of Oregon

15:10 – 15:30 **Pronatura's Center of Information for Conservation (CPIC): GIS support for conservation programs in Northwestern Mexico and the Sea of Cortez**
Gustavo Daneman - Pronatura Noreste (Northwest)

15:30 – 15:50 **A first "straw man" vision of a MPAs' network in Baja California and inputs for the design of a MPA paradigmatic case**
Alfonso Aguirre - Agromarinos/ B2B; César García - CICESE

15:50 – 16:10 Break

16:10 – 16:30 **North American Conservation Areas Database (NCAD)**
Rob Vanderkam - Canadian Wildlife Service, Environment Canada

16:30 – 16:50 **A biogeographic assessment of marine resources off North/Central California**
Chris Caldow - NOAA

16:50 – 17:10 **Marine conservation at a regional scale: Developing a science based-network of marine reserves in the Gulf of California**
Gustavo Paredes - Scripps Institute of Oceanography

17:10 – 17: 30 **An overview of The Nature Conservancy's Marine Ecoregional Planning**
Mike Beck, Zach Ferdana, Paul Dye - The Nature Conservancy; Curtis Tanner—USFWS

17:30 – 17:50 **GIS experience and resources linked to coastal planning in Baja California, Mexico**
Alejandro Hinojosa - CICESE, Cartography Department

17:50 - Adjourn

18:30 – 20:30 Reception – Beer and Pizza

DAY TWO: July 2, 2002:
Workshop Discussion

Note to participants:
The first day presentations were organized to reflect the recommendations of scientists and marine conservationists that attended a workshop in May 2001. These recommendations focused on the goal of preserving unique aspects of biological diversity (including, ecosystems, species and genetic diversity) for the entire Baja California to Bering Sea region. The priority setting exercise is planned for later this fall. We would like you to review the information presented and consider which of these data sets are important in your mind to setting conservation priorities. We would like you to address the information presented as well as brainstorm and add other data sources. Any help you can provide in locating this information is greatly appreciated.

8:30 - 8:45 Lance Morgan, **Introduction to B2B Priority Areas**

8:45 - 9:00 Peter Etnoyer, **The B2B data grid and data organization**

9:00 - 9:15 Dave Revell, **Surfrider Projects**

9:15 - 10:15 **Break out Discussion - "Review of data sets"**

10:15 - 10:30 Reports from Break outs

10:30 - 10:45 Break

10:45 - 11:45 **Break out Discussion - "Analyses for defining pelagic and benthic habitats"**

11:45 - 12:00 Report from Break outs

12:00 - 13:00 Lunch

13:00 - 13:15 Michele Dailey, **InfoRain**

13:15 - 13:30 Carlos Valdes, CEC - **NABIN**

13:30 - 14:30 **Break out Discussion - "Information needs of the community & web serving"**

14:30 - 14:45 Reports from Break outs

14:45 - 15:00 Final Remarks

15:00- Adjourn

APPENDIX 2. PRESENTATION ABSTRACTS

1. ArcGIS marine data model

Dawn Wright - Oregon State University
http://dusk.geo.orst.edu/djl/arcgis

Over the past two years ESRI, with a significant amount of user community input, has been engaged in the exercise of building "industry-specific" data models for ArcGIS. There are a number of efforts currently underway in most of the industries and scientific disciplines that ESRI serves (e.g., transportation, telecommunications, and energy utilities; forestry, surface hydrology, and conservation/biodiversity). The marine community is the most recent group to join the fray! By "marine community" we mean people who apply GIS to the coasts, estuaries, marginal seas, and/or the deep ocean: academic, government or military oceanographers, coastal resource managers and consultants, marine technologists, nautical archaeologists, marine conservationists, marine and coastal geographers, fisheries managers and scientists, ocean explorers/mariners, etc.

The ArcGIS Marine Data Model represents a new approach to spatial modeling via improved integration of many important features of the ocean realm, both natural and manmade. The goal is to provide more accurate representations of location and spatial extent, along with a means for conducting more complex spatial analyses of marine and coastal data by capturing the behavior of real-world objects in a geodatabase. The model also considers how marine and coastal data might be more effectively integrated in 3-D space and time. Although currently limited to 2.5-D, the model includes "placeholders" meant to represent the fluidity of ocean data and processes.

For GIS users, an ArcGIS data model provides a basic template for implementing GIS projects (i.e., inputting, formatting, geoprocessing, and sharing data, creating maps, performing analyses, etc.); for developers, it provides a basic framework for writing program code and maintaining applications. A key advantage of the data model is that it should help users to take fuller advantage of the most advanced manipulation and analysis capabilities of ArcGIS, particularly its support of more complex rules that can be built into its geodatabases, and of objects with not only attributes, but behavior. ArcGIS data models also support existing data standards, so as to help simplify the integration of data at various jurisdictional levels (i.e., local, state/provincial, national, global).

The ArcGIS marine data model project was initiated in October 2001 and is an ongoing process, with much more input needed from the user community, especially in terms testing of the model with a variety of coastal and deep ocean data sets. Please visit http://dusk.geo.orst.edu/djl/arcgis for more information and to become involved in the effort.

2. The real time ocean environment

Jay Shriver - U.S. Navy Research Laboratory
http://www.ocean.nrlssc.navy.mil/global_nlom

The world's first eddy-resolving (1/16 degree) global ocean prediction system, developed by the Naval Research Laboratory, has been transitioned to the Naval Oceanographic Office (NAVO), Stennis Space Center, MS. It has been running in real-time at NAVO since 18 Oct 2000 and became an operational product on 27 Sept 2001. The system gives a real time view of the ocean down to the 50-100 mile scale of ocean eddies and the meandering of ocean currents and fronts, a view with unprecedented resolution and clarity, and demonstrated forecast skill for a month or more for many ocean features. It assimilates real- time altimeter sea surface height (SSH) data (currently from ERS-2, GFO and TOPEX/POSEIDON) and sea surface temperature (SST). The model is updated daily and 4-day forecasts are made daily. 30-day forecasts are made once a week. Nowcasts and forecasts using this model are viewable on the web, including SSH, SST, surface layer currents and 30-day forecast verification statistics for many zoom regions.

The NRL web address is http://www.ocean.nrlssc.navy.mil/global_nlom. Recent digital data (both nowcast and forecast data) are available via anonymous ftp at the address ftp://ftp7320.nrlssc.navy.mil/pub/smedstad/dailyout. See README for details.

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3. Altimeter data for marine habitat monitoring

Robert Leben - Colorado Center for Astrodynamics Research
http://www-ccar.colorado.edu/~leben

Since 1996, global maps of mesoscale sea surface height anomalies derived from tandem observations of the earth's oceans by altimeters aboard the TOPEX/POSEIDON and ERS-2 satellites have been processed and posted on the World Wide Web at the Colorado Center for Astrodynamics Research (CCAR) in near real-time. We have added Geosat Follow-On altimeter data and are prepared to include data from Envisat and Jason-1, as soon as those satellites are operational. The original near real-time system was based on a quick-look analysis that referenced the data to a high-resolution gridded mean sea surface available at the time. Recently, state-of-the-art mean sea surfaces have been derived that are based on a more complete record of altimeter observations. An updated mesoscale monitoring system using a new mean sea surface has been implemented and provides results that improve on the successful system implemented in 1996. The daily mesoscale data products are available within 18 hours of overflight and have generated significant interest from the online user community. The mesoscale maps have proven useful for monitoring habitat of marine mammals and understanding the behavior of a number of species, including Northern fur seals and Steller sea lions in the Bering Sea and sperm whales in the Gulf of Mexico.

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4. PFEL data holdings and data products: Serving fisheries science and resource management

Frank Schwing - NOAA/NMFS Pacific Fisheries Environmental Laboratory
http://www.pfeg.noaa.gov/

The Pacific Fisheries Environmental Laboratory's (PFEL) data holdings and related data products provide a suite of fisheries and marine mammal relevant data that cover the entire spectrum of the ocean environment - from surface or near-surface wind and pressure data that can affect the ocean, to surface and subsurface measurements of important oceanographic parameters that are updated near real-time. These include a variety of FNMOC fields, gridded fields calculated from GTS and GTSPP observations, and database systems that provide rapid access to the raw COADS and WOD98 datasets.

PFEL provides data and data products to users in a number of different forms including:

- at different levels of detail
- in a variety of formats, from GIS to visual-type data
- specially requested data
- through the web and live-access servers
-

The data available includes sea-level pressure, GTS sea-surface temperature, upwelling index, northern oscillations and currents. These data can be provided in a number of spatial and temporal forms. PFEL's implementation of the Live Access Server developed at PMEL provides the ability to subset, visualize, and download over the internet most of our gridded datasets.

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5. Topographic remote sensing using LIDAR

David Revell - Surfrider Foundation / NOAA Coastal Management Fellow
http://www.csc.noaa.gov/crs/tcm/index.html

LIDAR (Light Detecting And Ranging) data is gathered using laser ***altimetry*** on planes flying along the coastlines and is available for the west coast (excluding northern CA), as well as the east coast. LIDAR comes in a variety of data formats including grid point contours and TINs and is available through the US government as well as commercial vendors. Uses of LIDAR can include location of sea stacks, erosion and accretion changes through time, and physical beach parameters. LIDAR allows for the bridging of small scale nearshore processes with large scale shoreline changes. The resolution of the data is on the order of 15cm in the vertical and 1m in the horizontal. LIDAR coverage generally extends from the water about 700m inland. Downfalls of LIDAR data include the large size of the data sets, the fact that interpolation methods can vary results and the lack of temporal data which can limit the understanding of changes.

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6. Pelagic predators, prey and processes: An initiative to protect offshore organisms and habitats

Peggy Yen - Point Reyes Bird Observatory Conservation Science, Marine Science Division
http://www.prbo.org/marine/p4_report_0505.pdf

The goal of our research is to understand which habitat characteristics make certain oceanic areas more productive than others, and to determine if the locations and food-webs exploited by top predators in the California Current System are persistent enough to warrant designation of Marine Protected Areas (MPAs). To accomplish this goal, we have studied the spatial and temporal variability of seabird – cetacean dispersion, and the predictability of ocean productivity "hotspots" in offshore waters of the CCS. Surveys have been conducted in three geographically and ecologically distinct domains of the CCS for two main purposes. First, these quarterly to annual surveys will be used to determine predator-prey interactions within each domain. Second, the physical characteristics most important to species dispersion will be used to model habitat selection in areas where field studies have not been conducted. Our objective is to complete field studies in 2003, and prepare recommendations for MPA delineations in 2004.

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7. Monitoring eastern Pacific blue whale habits and habitats through satellite telemetry

Tomas Follett - Oregon State University Marine Mammal Program
http://marinemammalprogram.org/

The Marine Mammal Program has tagged 100 blue whales within the last seven years in an attempt to characterize habitat use during feeding and migration based on observed oceanographic conditions. The program uses satellite tags that transmit to the Argos platform aboard NOAA polar-orbiting satellites. It has been determined that the whales concentrate along the continental shelf edge for both feeding and migration, though they have been tracked offshore as much as 1,500 miles. Highly productive areas are used for feeding, and opportunistic feeding may occur in productive areas during migration as well. Winter habitat areas are variable from year to year though distinct individual ranges have been observed, and may used for calving as well.

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8. Reconnecting the Eastern Pacific Ocean: Long distance migrations and conservation of sea turtles

Wallace J. Nichols - WiLDCOAST International Conservation Team
http://www.wildcoast.net/

The coastal waters of the Californias were among the most important feeding and developmental grounds in the eastern Pacific for five of the world's seven species of sea turtle. Green turtles migrate along the coast of the Californias, eating mostly red algae, sea grass, and invertebrates. Both immature and mature green turtles are found in this region and most originate from rookeries in southern Mexico. Loggerhead turtles make a trans-Pacific developmental migration, most originating from Japanese nesting beaches. Along the coast of the Californias they primarily eat red crabs and their distribution is often based on crab abundance. Immature loggerhead turtles are most commonly that found in the Californias. Olive ridley turtles mate and nest along the Southern Baja California Peninsula. Hawksbill and leatherback sea turtles are occasionally found along the Californian coast, but are nearing extirpation in the region. New research shows that leatherback turtles feeding on jellyfish in Monterey Bay originate on Indonesian rookeries.

Since the early 1900's sea turtles have been harvested commercially and for household use in the Californias for their meat, hides, and shells. This fishery can be traced back to the earliest inhabitants of the region and has been a part of the regional culture for centuries. Caldwell (1962) referred to the East Pacific green, or black turtle (*Chelonia mydas*) as the "black steer" in reference to its coloration, abundance and importance as the chief source of meat in the dry, desolate region. Other species that were harvested included the hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*), and olive ridley (*Lepidochelys olivacea*) turtles. Within 20 years regional sea turtle populations had been nearly extirpated, resulting in drastic management efforts and ultimately a complete ban on turtle products in 1990. Despite the 1990 ban on all sea turtle products, annual numbers of green turtles nesting in Mexico and loggerhead turtles in Japan have continued to decline. This is the result of incidental bycatch of sea turtles, illegal harvest for black markets, and continued local use of turtle products throughout the region. If sea turtle populations are to recover, those working on conservation and protection efforts must understand, document, and address the human dimensions, both historical and contemporary of the problem.

9. Occurrence of leatherback sea turtles off the coast of Central California

Scott Benson - NMFS
Peter Dutton - NMFS
Scott Eckert - Hubbs-Sea World Research Institute
Benson@mlml.calstate.edu

The leatherback sea turtle (*Dermochelys coriacea*) is the largest sea turtle, weighing up to 1,500 pounds. Leatherbacks are considered critically endangered due to the demise of once large populations throughout the Pacific Ocean. Past and current threats include intentional harvesting of eggs and adults, and incidental bycatch in fisheries throughout the Pacific Ocean. The leatherback turtle has the most extensive range of any living reptile, performing long migrations between low latitude nesting areas and high latitude foraging grounds, where they consume large quantities of gelatinous prey, such as jellyfish. Two metapopulations exist in the Pacific; a Mexico/Central America nesting population that migrates to foraging grounds offshore of South America, and a western Pacific nesting population that migrates to foraging grounds offshore of North America. The average time to complete a full migration is approximately three years. Leatherbacks are the most commonly seen sea turtle off central California, a region that is strongly influenced by coastal upwelling during early summer. The frequency, duration, and relaxation of upwelling-favorable winds can influence food web development in this region, including the occurrence and concentration of leatherback prey, such as scyphomedusae. Greatest leatherback densities are found offshore of Pt. Reyes, Half Moon Bay, and Monterey Bay. We hypothesize that leatherback turtle abundance is linked to the hydrographic retention of zooplankton and subsequent concentration of scyphomedusan prey in these coastal areas during relaxation of upwelling-favorable winds. Current research involves aerial surveys to assess leatherback abundance and distribution off California, and the attachment of satellite tags to individuals captured off central California, and at nesting beaches in Mexico, Central America, and the western Pacific to document migration pathways and diving behavior.

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10. Ye gods! Commercial fishery harvest databases for Alaska

Tim Harverland - Alaska Department of Fish and Game
http://www.cf.adfg.state.ak.us/cf_home.htm

The Alaska Department of Fish and Game database is comprised mostly of fish ticket information, which is a record of the first purchase of a fish catch. Fish tickets include information on the fishery, date of fishing, area fished (to the ½ degree latitude and one degree of longitude for salmon and groundfish), the type of gear used, the species caught and the area in which it was caught. Summarized catch and effort data, and statistical area and port maps for Alaska are currently available. A publications database will soon be available, as well as an MPA inventory, including the MPA developing process, will be available by October.

ADF&G Division of Commercial Fisheries GIS Maps and Data Server:
http://maps.cf.adfg.state.ak.us/

ADF&G Division of Commercial Fisheries home page:
http://www.cf.adfg.state.ak.us/cf_home.htm

For Alaska fishery harvest information contact:
Susan Shirley
mailto:susan_shirley@fishgame.state.ak.us
907-465-6105
907-465-2604 (fax)

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11. Lessons and products from the groundfish fleet restructuring project

Ed Backus - Ecotrust
http://www.ecotrust.org/gfr

The Groundfish Fleet Reduction Project was initiated to link ecology, fishery-dependent and socioeconomic spatially explicit coastwide data in order to examine options to restructure the groundfish fleet and minimize the ecological and socioeconomic impacts of the fishery collapse. Databases for the project include fishery dependent data, shelf and slope fishery survey data, bathymetry, ports, effort data and gear type data over the states of California, Oregon and Washington. Part of the aim of the project is to make all of these data spatially explicit. These data can be used to model the effects of the recent shelf closures and to build scenarios for restructuring the groundfish fleet using numerical approaches, permit stacking, fleet diversity, and viability among others. The outcomes of the project will be: a comprehensive set of data and information in a format that can be used by all who wish to explore capacity reduction options and other management measures, a set of analytical tools based on this database; a set of policy options; and an executive report to be presented to the Pacific Marine Conservation Council and the Pacific Fishery Management Council. Complete project information is available at the listed website.

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12. Untrawlable areas, species assemblages and relationship to surficial sediments in the NMFS west coast bottom trawl survey

Mark Zimmermann - NOAA/NMFS
http://www.afsc.noaa.gov/race/default.htm

NMFS conducted nine fishery-independent bottom trawl surveys along the US west coast on a triennial basis from 1977-2001. Data from these surveys have been used as important elements in stock assessments, however, there has never been a thorough, systematic review of these data. An analysis demonstrated that numerous bottom trawl hauls caught a deficient amount of bottom-dwelling species, in comparison to catch rates

from trawl hauls in a modern survey, indicating that the net probably was not dragged on the ocean floor. Removing these bottom trawl hauls increases the biomass estimates as much as 50% for numerous species in 1977, 1980, and 1983. Another analysis was conducted which used the instances when the net was damaged and stations were abandoned (data never used for stock assessments) to determine the amount of area that is untrawlable to the NMFS survey gear. Initial results show that survey strata range from 100% to 18% trawlable, indicating that the survey was not able to effectively sample large parts of the survey area. Catches of rockfish (*Sebastes* sp.) were generally higher in damaged trawl hauls, indicating that the survey has been unable to sample the places where rockfish are most abundant. A third analysis is in progress, which is attempting to relate species- and station-assemblages to a newly created west coast habitat (sediment) map, in order to determine boundaries between regions which are ecologically different. These boundaries may be useful for planning future bottom trawl surveys, which have typically been stratified on the basis of latitude and depth. These three projects demonstrate the need for a more integrated approach to data collection and data analysis in west coast groundfish research, with an emphasis on developing an understanding of data collection methods.

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13. Historic fish taxa in Oregon estuaries, from ethnographic accounts and other historic records

Scott Byram - Consulting Archaeologist, Coquille Indian Tribe Cultural Resource Program
Marguerite Forest - Coquille Indian Tribe

This data set was generated through nearly a decade's research on estuary fishing practices of Oregon coast Indian peoples. It includes information gleaned from archival records that document the oral history of elders from Oregon tribes, including people of Coquille, Coos, Kalawatset, Siuslaw, Alsea, and Tillamook ancestry. Other sources include historic newspaper accounts, settlers' journals, military records, and other government documents. These qualitative data indicate that there have been massive changes in the relative abundance of several marine fish taxa. In particular, forage fish populations, including clupeids, osmerids, and atherinids, were once far more abundant (seasonally) in Oregon estuaries than they have been during the past century.

Other taxa that were harvested in massive numbers by Native communities historically include Pacific lamprey, salmonids, and several demersal fishes such as starry flounder. The data summarized here have been presented in Dr. Byram's Ph.D. dissertation (University of Oregon Anthropology Department, June, 2002) along with archaeological and paleoenvironmental findings relating to traditional Native fishing practices in Oregon estuaries.

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14. Using GIS to integrate data sources for sea otter restoration in Oregon

Marguerite Forest - Coquille Indian Tribe

Sea otter fur trade began with the Bering expeditions in the mid-1700s. Though their pelts were the least numerous traded, they were the most valuable. By the mid-1800s sea otter had been exterminated from almost their entire range from Japan to Mexico. Only 13 colonies were left when the 1911 Fur Seal Treaty banned hunting. The last sea otters in Oregon were killed at Newport in 1906. The remnant population on Haida Gwaii was killed in 1919. These two areas, along with northern California and Baja California, still have no sea otters. In the 1970s, Alaskan sea otters were reintroduced to the northwest coast of Vancouver Island and the Olympic Peninsula. Attempts to reintroduce them to the Oregon coast failed. Spatial data on the historical distribution of sea otters, as well as their remaining populations, is available. Populations are not evenly distributed along the coast but are rather highly clumped. GIS mapping, including aerial photography, is been used in conjunction with other data to determine locations where future reintroductions might be successful.

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15. Extirpated species from Oregon coast archaeological sites and beyond

Robert Losey - University of Oregon

Native American archaeological sites along the west coast of North American contain an important 'fossil record' of the Holocene. Many sites, including many dating to last several hundred years, contain the remains of species that are now extirpated or extremely rare. For example, short-tailed albatross are the most common albatross species in coastal archaeological sites spanning from Alaska to southern California but now are one of the rarest birds in the world. Guadalupe fur seals have been found in small numbers in northern Oregon and Washington archaeological sites but today rarely venture north of the Channel Islands of southern California. Sea otters, now extirpated from the Oregon Coast, were the most commonly used sea mammal here as recently as 350 years ago. Clearly, archaeological data can provide one of the best long-term records of environmental change, particularly in areas lacking a historically deep written record.

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16. Pronatura's Center of Information for Conservation (CPIC): GIS support for conservation programs in Northwestern Mexico and the Sea of Cortez

Gustavo Daneman - Pronatura Noreste (Northwest)
http://www.pronatura.org.mx/

Pronatura Noroeste-Mar de Cortés (PNOMC) is a chapter of Pronatura A.C., a Mexican non-governmental nonprofit organization dedicated to the conservation of Mexico's biodiversity. Pronatura A.C. was created in 1981 by a group of prominent Mexican entrepreneurs concerned about the rapid degradation of habitats and natural resources.

NOMC was created in October 2001, to integrate the former Pronatura Península de Baja California, Pronatura Sonora, and Pronatura Sinaloa, into a single regional organization. Its mission statement, shared with the other Pronatura family organizations is: "To conserve the flora, fauna and priority ecosystems of Northwestern Mexico, to promote the development of society in harmony with nature". This mission and mandate includes all the ecoregions in the Baja California Peninsula, Sonora, Sinaloa and Nayarit, its Islands, coastal Pacific waters, Sea of Cortez (Gulf of California), and western portions of Chihuahua and Durango. Pronatura collaborates with local communities, government agencies and other national and international organizations, and base all our activities on scientific research and conservation actions in a non-confrontational approach.

Regarding GIS, Pronatura supports other civil and nongovernmental organizations through four regional GIS facilities: the Pronatura Centers of Information for Conservation (CPICs) in the Northwestern and Northeast of Mexico, Chiapas and Yucatán.

Currently in the CPIC-Northwestern, we are providing GIS support to the following conservation projects and programs:

1) Las Californias Binational Conservation Reserve Initiative, Tijuana-Tecate region, Baja California.
   Partners: PNOMC land conservation program, International Community Foundation (ICF), San Diego State University (SDSU), San Diego Back Country Land Trust, Conservation Biology Institute (CBI).
2) Bioecological assessment of Concepcion Bay, Baja California Sur, Mexico.
   Partner: Wildcoast.
3) Initiative for the creation of the "Bahía de Los Angeles" National Park, Baja California.
4) Conservation of the Arroyo Toad (Buffo californicus), and its habitat in northern Baja California.
5) Conservation and sustainable development of the Magdalena Bay Coastal Lagoon System, Baja California Sur.
6) Initiative for the creation of the "Punta Banda Estuary" State Reserve, Baja California.
   Partner: Proesteros.
7) Interpretative materials for the "Sierra de San Pedro Martir" National Park, Baja California.
8) Bioecological assessment in the La Asamblea-San Francisquito coastal corridor, Baja California

For GIS related questions please contact:

José M. Beltrán-Abaunza (jbeltran@pronaturanw.org)
CPIC-NW Coordinator

17. A first "straw man" vision of a MPAs' network in Baja California and inputs for the design of a MPA paradigmatic case

Alfonso Aguirre - Agromarinos/ B2B
César García - CICESE

Within the Baja California to Bering Sea scale, the peninsula of Baja California represents a coastal conservation enclave, almost free of intense development. Such a condition, however, is not the result of an explicit social construction or conscious plan based on environmental values. It derives only from past-times difficulties for investors to acquire coastal lands as private property. With recent legal reforms, the region's environment is now highly threatened. Beyond the simple defense against development plans — marina's nautical corridor, natural gas coastal regasification plants and mega-resorts, among others — a marine protected areas network vision — which is provided — is needed to give substance and focus to a pro-active marine regional sustainable development and coastal conservation paradigm. At the regional level, the inputs for the MPAs network design have to be tailored *ad hoc* for the region's environmental, natural resources, legal, cultural, social and economical specific conditions. At the site scale, the inputs for the MPA's design must follow a blend of Municipal guidelines — as the Mexican Constitution establishes — for land, and the federal requirements for the marine and islands portions. The example of the San Quintin bay — a real time case — is provided, showing the land and water zoning GIS layers as defined by jurisdiction, the actors and conservation values.

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18. North American Conservation Areas Database (NCAD)

Rob Vanderkam - Canadian Wildlife Service, Environment Canada.
http://www.geogratis.gc.ca/

NCAD is a Microsoft Access database of nearly 8,000 conservation areas and was compiled in 2000 in cooperation with Mexico, the U.S., and Canada. It combines national databases of terrestrial conservation sites from each country including:

- the US Managed Areas Database 1996
- the Mexican Protected Areas Database 1995, and
- the Canadian Areas Conservation Database 1999 (CCAD).

(CCAD, also available on the GeoGratis web site, has been kept current as a separate product.) Each site record has attributes such as size, location (latitude and longitude), ecoregion, IUCN code, and others that can be used for analyses. These databases are regional products and as such can provide answers to small-scale geospatial questions and provide a focus and framework for larger-scale (small area) questions.

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20. A biogeographic assessment of marine resources off North/Central California

Chris Caldow - NOAA
http://biogeo.nos.noaa.gov/

This project is similar to B2B, but on a smaller scale. It involves conducting a biogeographic assessment of selected marine resources off north and central California. The objectives of the assessment (to be completed by September 2002) are to organize data into GIS format, to identify important biological areas and time periods, to produce a report discussing caveats, gaps and linkages within and between ecosystems, and to describe influences on ecosystems. Data sets include fish, invertebrate, mammal and seabird distribution, and environmental components (i.e. bathymetry, SST, etc). The assessment will also determine the suitability of data. Once the north/central California assessment is completed, similar work will begin in the Olympic National Marine Sanctuary and Channel Islands National Marine Sanctuary.

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21. Marine conservation at a regional scale: Developing a science based-network of marine reserves in the Gulf of California

Gustavo Paredes - Scripps Institute of Oceanography

There is debate concerning the most effective conservation of marine biodiversity, especially regarding the appropriate location, size, and connectivity of marine reserves. We describe a means of establishing marine reserve networks by using optimization algorithms and multiple levels of information on biodiversity, ecological processes (spawning, recruitment, and larval connectivity), and socioeconomic factors in the Gulf of California. A network covering 40% of rocky reef habitat can fulfill many conservation goals while reducing social conflict. This quantitative approach provides a powerful tool for decisionmakers tasked with siting marine reserves.

See 2002 article in *Science* 298:1991-1993.

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22. An overview of The Nature Conservancy's Marine Ecoregional Planning

Mike Beck, Zach Ferdana, Paul Dye - The Nature Conservancy
Curtis Tanner - USFWS

The Nature Conservancy has completed five marine ecoregional plans (Bering Sea; Cook Inlet, AK; Central Caribbean; northern Gulf of Mexico; Central America) and is at work on 10 other plans. Our most recent and advanced plan is in the Puget Trough ecoregion which encompasses Puget Sound and the Georgia Straits. We selected over 100 targets for conservation planning with a principal focus on nearshore ecosystems in the Puget Trough. We were able to find data on ~ 70% of these targets. Conservation goals were

set at 30% of current acreage for ecosystems and 30%-60% of known occurrences for species. We analyzed the data first using the program SITES to help identify potential priority areas and then modified the output based on advice from experts. We used a cost factor in Sites analyses to avoid impacted areas (e.g., those areas with extensive hardened shorelines). We also have been attempting to better integrate priority areas across terrestrial, freshwater and marine environments.

From The Conservancy's experience, we suggest the following advice for marine ecoregion planning:

- Identify targets quickly, focus on ecosystems; use fewer species.
- Include aggregations and convergences (e.g., upwelling)
- Make aims clear
- For TNC- these are not MPA plans
- For biodiversity plans only include fished species if:
    - fished species are imperiled -OR-
    - fishing impairs ecosystem integrity by reducing fish populations
- Realize that obtaining data is only 30% of the task
- Include historical data
- Involve partners early
- Look for potential low hanging fruit (stop picking the battle scenes)

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23. GIS experience and resources linked to coastal planning in Baja California, Mexico

Alejandro Hinojosa - CICESE, Cartography Department
http://www.cicese.mx/~proester/inv

A briefing of CICESE research center in Ensenada, Baja California, is presented, focusing on the different groups, and projects related to marine and coastal conservation. The Baja California Coastal Wetlands Inventory (http://www.cicese.mx/~proester/inv), is a source of information for 10 wetlands in the Pacific coast of the Baja California Peninsula including an ecological profile, species list, management perspectives and a set of maps and satellite imagery for each site. This is a project coordinated by Pro Esteros, an NGO dedicated to coastal conservation, with the participation of scientists from CICESE and UABC. Currently, the inventory is being augmented with 12 additional small wetlands on the Pacific Coast that are being profiled with aerial photographs and high resolution satellite imagery. Efforts are being made to add dynamic map capabilities to the web page through map and image web servers ikonos2.cicese.mx/sampleiws/default.htm), to enable map querying, zooming and panning. Different alternatives are being tested, like the open source MapServer from the University of Minnesota and ESRI's ARC/IMS.

Efforts to merge topographic and bathymetric models have been made, the areas developed are Peninsula and Gulf of California, and the Ensenada to San Diego region. With the support of the Telemanufacturing facility at the San Diego Super Computer

Center, a scaled physical model for the Ensenada San Diego region was built (13”x 13”). A photo of the model can be seen at http://geologia.cicese.mx/mapas/3dmodel.jpg.

A remote sensing retrospective of the Colorado River delta is being studied in collaboration with UCSB, to estimate the effects of the flow variations from USA to Mexico to the wetlands in the delta (http://geologia.cicese.mx/RCdelta/). The native wetlands that formerly dominated this region have almost disappeared. The main wetlands in the delta that remain are the Cienega Santa Clara and the Rio Hardy. They are very important ecosystems that host a natural habitat for fauna and flora that need water on a consistent basis to support vegetation. To project is intended to support restoration efforts and to assist in the estimation of an ecological quota of water for the wetlands.

APPENDIX 3. SURVEY FORM

B2B Priority Setting Data Potluck Survey

1. Personal Information

Name:
Organization:
Address:

Email:
Phone:
Relevant Projects:

2. Data Needs and Interests

NOTE: The data presented yesterday may or may not be used to designate marine conservation priorities for the Baja to Bering MPA Initiative at an experts workshop in October. When answering the questions below, please recognize this scale of analysis, and respond accordingly.

Please rank the following data types in terms of relevance to your area of interest (Rank 1-17, or 1-20 if all "other" are complete). Please make “1” represent your most important data, and “17” your least important data.

PHYSICAL	BIOLOGICAL	SOCIAL
____ Bathymetry	____ Chl_a	_____ Ports and Harbors
____ LIDAR	____ Species Atlas	_____ Fishing pressure
____ SST	____ Mammals tracks, distribution	_____ EEZ
____ Altimetry (surface currents)	____ Turtle tracks, distribution	____ MPA designations
____ Seamounts	____ Seabird tracks, distribution	_____ Priority Settings
____ Other:_____	____ Deep Sea Coral distribution	____ Other:_____
	____ Other:_____	

3. How would you like to see the aforementioned data layers used to generate a list of priority habitats for the B2B region? (One example, seamounts closest to largest fishing ports = high priority. Another example, previously designated MPA = low priority)

4. What data is missing that you would like to see available?

APPENDIX 4. SURVEY RESULTS (20 Respondents)

Question 2: Please rank the following data types between 1 and 5 for how well these data might strengthen a GIS priority habitat analysis at the continental scale. 1= will not add much to the analysis, 5 = will strengthen the analysis considerably

Physical Data Type	Rank
Bathymetry	4.67
Other	4.66
Seamounts	3.93
Sea Surface Temperature	3.71
Altimetry (Surface Currents)	3.59
LIDAR	2.67

Biological Data Type	Rank
Primary Productivity	4.67
Other	4.66
Mammal Tracks /Dist.	4.23
Submerged Aquatic Vegetation	4.19
Seabird Tracks/Dist.	4.10
Turtle Tracks/Dist.	4.05
Deep Sea Corals	3.93
NOAA Atlas	3.67

Social Data Type	Rank
Other	4.78
MPA	4.53
Fishing Pressure	4.49
Jurisdictions	4.00
Ports and Harbors	3.87
Previous Priorities	3.66
NGO activity	2.87

Other	Count
Substrate	4
Sediment Transport	3
Lagoons	3
Upwelling	2
Consistent high resolution shoreline, upwelling, salinity, shelf, ocean features	2

Other	Count
Spawning Aggregations	4
Fish Sp. Distributions	3
Nurseries	2
Feeding Aggregations	2
Large Predators, Benthic Sp. Assemblages, historical abundance/ distribution, migration corridors, kelp/ mangrove	1

Other	Count
Cables	4
Political climate	4
Community will	4
Pollution/Dump sites	4
Recreational uses	3
Outfalls, shipping channels, economic impact, fishing grounds, indigenous use	2
Pipelines, current litigation, shipwrecks, ongoing efforts, oil leases, population, enforcement, access, mega-development projects	1

Comments: Bathymetry and primary productivity were ranked highest for their ability to strengthen a priority area analysis. All data save LIDAR and NGO Activity ranked above 3.5 on a scale of 5. Respondents generally valued their contributions ("Other") highly, with substrate type, spawning aggregations, submarine cables, political climate, pollution and community will each receiving unsolicited votes from 20% of the respondents.

Question 3: How would you like to see the aforementioned data layers used to generate a list of priority habitats for the B2B region?		
Participant	Affliation	Response
Tim Haverland	AKDFG	…for fish, I think you need to first figure out what species appear to be declining, then key in on those species and find those areas that provide the most benefit with the least cost and the most potential for success… partner with local resource agencies to find common ground. This will greatly increase your chances for success…
Alfonso Aguirre	Agromarinos/B2B	We need to develop an index of governance viability. This would integrate local community existence and attitude, a favorable legal framework, positive government attitude, viable enforcement. Highest priority (HP) = H productivity + H diversity + Physiography (bay, island, lagoon, seamount) + H Threat + H Governance viability
Dave Canny	MCBI	fully integrate all data
Alejandro Hinojosa	CICESE	...[develop] a simple comprehensive model that can convince all stakeholders of the importance of protecting marine areas
J. Nichols	Wildcoast/CAS	previously designated MPAs and priority areas = highest priority
Dave Revell	Surfrider	highest priority = high biodiversity + high fishing pressure + high community ethic/willingness; prioritize MPAs to increase existing levels of protection
John Olson	NMFS	gap analysis of existing MPAs. Clearly define the purpose of the listing of priority habitats.
César García	CICESE	bathymetry + primary productivity + NGO, Academic, Govt. offices + population = [highest priority]
Gustavo Daneman	Pronatura Noreste	highest priority = previously designated/proposed/ongoing local interest/high productivity/high fishing effort/high threat
Gustavo Paredes	SIO, CMBC	highest priority = all attributes closest to high population
Pierre Iachetti	TNC Canada	use some sort of annealing algorithm (SITES, MARXAN) to come up with priority habitats. Highest priority = physical feature + species distribution +socio-economics + threats.
Maria Kavanaugh	Oregon State University/ PISCO	many choices are dependent on scale. If the map was interactive, one could potentially have universal layers (bathymetry, SST, altimetry, jurisdictional boundaries) then one could download specific biological information, localized hydrography, localized upwelling…
Ed Backus	Ecotrust	definitions need to be sorted out, esp 'priority habitats'
Peggy Yen	PRBO	…permanent vs. ephemeral hotspots. e.g. long term chlorophyll data to identify permanent high productivity areas= permanent MPAs. Seasonal/temporal variability = ephemeral hotspot.
Mike Mertens	Ecotrust	analysis of socio-economic data- how will MPAs and other regulations impact ports and fisheries?"-
Michael Schindel	The Nature Conservancy	Stratify the physical environment by seasonal averages and build reserve design around representative areas to capture coarse and fine scale targets
Marguerite Forest	Coquille Indian Tribe	distinguish coarse (NE Pacific) from finer scale datasets. The former is important for broad regionalization, representation and driving forces, the latter is important for particular plans, lifecycle needs, unique locations, etc…

Question 4: What data is missing that you would like to see available?		
Participant	**Affiliation**	**Response**
Paul Klarin	OR Coastal Management Program/DLCD	more socio-economic. more land/water interface- rocky shores, intertidal, estuarine
Maria Kavanaugh	Oregon State Univ/PISCO	My concern is that proxies tend to mask the mesoscale and microscale. Many studies (MMS, PISCO) have been done on US coast that assess intertidal species abundances and geographic ranges. These would be helpful here.
Tanya Haddad	Oregon Coastal Management Program	a good consistent scale shoreline
John Olson	NMFS	benthic habitat, GLORIA sidescan, georeferenced
Ed Backus	Ecotrust	Essential fish habitat (EFH) data is coming…
Peggy Yen	PRBO	benthic vs. pelagic temperature/salinity
J. Nicholas	Wildcoast/CAS	social data like political climate and ocean ethic…
Mike Mertens	Ecotrust	species distributions
César García	CICESE	economic uses and activities.
Dave Canny	MCBI	pollution, community receptivity
Bob Leben	Colorado Center for Atmospheric Research	SST fronts, physical oceanography statistics
Gustavo Daneman	Pronatura Noreste	socio-cultural data- political processes, grassroots community leadership
Marguerite Forest	Coquille Indian Tribe	water quality data
Dave Revell	Surfrider	more socio-economic
Alejandro Hinojosa	CICESE	fisheries distribution, and some kind of spatial distribution of catch decline. A historic record of catch effort
Pierre Iachtti	TNC Canada	better species distributions data and better bathymetry
Christ Caldow	NOAA	info on fish and bethic species distributions, info on sediment type.
Alfonso Aguirre	Agromarinos, B2B	kelp beds, eelgrass, 3D model of bathymetry, governance/feasibility index

APPENDIX 5. LIST OF ATTENDEES/PARTICIPANTS

Name	*Affiliation*
Aguirre, Alfonso	Agromarinos SA/B2B
Auyong, Jan	Oregon State
Backus, Ed	Ecotrust
Bailey, Allison	Terralogic GIS
Bartier, Pat	Parks Canada
Beck, Mike	The Nature Conservancy
Bellman, Marlene	Ecotrust
Benson, Scott	NMFS
Brady, Eileen	Ecotrust
Brownlee, Julia	NOAA
Byram, Scott	Coquille Indian Tribe Cultural Resource Program
Caldow, Chris	NOAA
Chesney, Bryant	NMFS
Corrigan, Colleen	MCBI
Dailey, Michele	Ecotrust
Dana, Randy	OR Coastal Management Program
Daneman, Gustavo	Pronatura
Davis-Born, Renee	PISCO
Dietrich, Kim	University of Washington
Dye, Paul	The Nature Conservancy of Washington
Etnoyer, Peter	MCBI
Follett, Tom	Oregon State University
Forest, Marguerite	Coquille Indian Tribe
García, César	CICESE
Glock, Jim	NMFS
Good, Jim	Oregon State University
Haddad, Tanya	OR Coastal Management Program
Hamel, Nathalie	University of Washington
Haverland, Tim	Alaska Department of Fish and Game
Hinojosa, Alejandro	CICESE
Iachetti, Pierre	The Nature Conservancy
Jauron-Mills, Linda	
Kavanaugh, Maria	Oregon State University/PISCO
Klarin, Paul	OR Coastal Management Program/DLCD
Langdon-Pollock, Jennifer	
Leben, Robert	CCAR
Lee, Lynn	WWF Canada

Name	*Affiliation*
Losey, Rob	University of Oregon
Lott, Dave	NOAA/NOS Special Projects and National Marine Sanctuaries
MacMillan, Greg	Parks Canada
Maxwell, Sara	MCBI
Mertens, Mike	Ecotrust
Mills, Justin	Oregon State
Minoura, Toshimi	Oregon State
Morgan, Lance	MCBI
Nichols, Wallace J.	Wildcoast and California Academy of Sciences
O'Dea, Liz	OSU Geosciences
O'Keefe, Sheila	Oregon State University
Olson, John	NOAA NMFS
Overholtzer, Karen	Oregon State
Paredes, Gustavo	Scripps Institution of Oceanography
Pray, David	Ecotrust/Alaska Conservation Alliance
Reed, Jim	The Hydrologic Group
Revell, David	Surfrider Foundation
Schindel, Michael	The Nature Conservancy
Schwing, Frank	PFEL
Scott, Mark	Pacific County
Scranton, Russell	Oregon State University, COAS
Seekins, Barbara	NOAA
Sheard, Wit	The Ocean Conservancy
Shriver, Jay	US Navy Research Lab
Silverman, Howard	Ecotrust
Smoker, Janet	Fisheries Information Services
Stillwaugh, Sid	NOAA, National Coastal Data Development Center
Tarakali, Mike	Oregon State University
Valdes, Carlos	CEC
Vanderkam, Rob	Canadian Wildlife Service
Von Hagen, Bettina	Ecotrust
Wangmutitakul, Paphun	Oregon State University
Wedell, Vicki	Oregon State
Wuttiwat, Teironot	Oregon State University
Wood, Wayne	PISCO
Wright, Dawn	Oregon State University
Yen, Peggy	PRBO
Zimmermann, Mark	NOAA

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